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From the SCS Chief

Conservation—A Story to Keep on Telling

Lately, we've seen more coverage of soil and water conservation issues in local, statewide, and nationwide newspapers, magazines, and radio and television broadcasts.

Some of this may be the result of conservation district and Soil Conservation Service celebrations of 50 years of soil conservation. Congratulations to all those who are working so hard to make the celebrations both meaningful and interesting.

Let's not, however, return to "business as usual" after the celebrations are over. Let's capitalize on the interest we've generated.

SCS field employees working directly with individuals and small groups is the most effective way to convince land users to try conservation practices. But, news media can be invaluable in reaching a broader audience with our conservation message as well as reinforcing our message to land users.

I've always said that our work with farmers, ranchers, and others is a good story that too few people ever hear.

At SCS National Headquarters we are organizing several campaigns to reach our traditional audiences as well as people we may not be reaching right now. Some of these campaigns will feature information on flood plains, conservation tillage, and volunteerism.

One SCS goal under the National Conservation Program is helping to develop a consensus on steps needed in both public programs and private actions to properly use and conserve the Nation's soil and water resources. A part of this is providing the public more information on the offsite benefits of soil conservation.

An informed public is and will be our best ally in saving soil and water.

Cover: Patterns of the Palouse, Whitman County, Wash. (Photo by Tim McCabe, former photographer, SCS, Washington, D.C.)

John R. Block
Secretary of Agriculture

Wilson Scaling, Chief
Soil Conservation Service

All programs of the U.S. Department of Agriculture are available to everyone without regard to race, creed, color, sex, age, or national origin.

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Tillage Methods Tested for Northern Great Plains

Adapting conservation tillage techniques for irrigated row crops in the Northern Great Plains is the primary objective of a 6-year study underway in the Nebraska Panhandle.

The relatively dry Northern Great Plains, as exemplified by the Nebraska Panhandle, present a special set of problems for conservation tillage. With conservation tillage, irrigated corn in the area can produce 185 bushels per acre. The climate is so dry, however, that the abundant corn residue does not decompose the way it does in the Corn Belt. Planting the following crop in this residue requires equipment that can penetrate the soil and ensure good seed-soil contact.

Yet there is a great need for conservation in the area. The Soil Conservation Service estimates that annual soil loss to erosion on agricultural land in the Northern Great Plains ranges between 8 and 40 tons per acre. This loss is primarily the result of water erosion, accelerated by irrigation, and some wind erosion. It is estimated that more than 2 million tons of soil is eroded annually from the Nebraska Panhandle by surface irrigation alone.

Major irrigated crops in the Panhandle are corn, dry edible beans, sugar beets, and alfalfa. The crop fields vary in slope from nearly level to 9 percent. Irrigation water applied down furrows generally creates more erosion on the steeper slopes. Although a slow process in many fields, the erosion is evident by drainage ditches filled with sediment and the loss of soil from the upper ends of steep fields.

SCS initiated the study as a cooperative effort with the North Platte Natural Resources District and the University of Nebraska. The purpose of the study is to develop both basic and practical information on conservation tillage to encourage and enable farmers in the area to adopt improved conservation practices. Researchers hope to develop methods to reduce the erosion by water and wind, particularly on furrow-irrigated steep slopes; to reduce production costs, energy use, and machinery investment; and to provide an information base for farmers who are interested in conservation tillage for both furrow-irrigated and sprinkler-irrigated cropping. Funding for the first 3 years has been provided under the Soil and Water Resources Conservation Act of 1977 (RCA).

The goal for the first year (1983) of the study was to establish field plots and crop rotation, obtain the appropriate field equipment, and secure the necessary instrumentation for field measurements. More than 40 acres of field-size plots were established at the University of Nebraska Scottsbluff Agricultural Laboratory and also at an "off-station" site near Mitchell, Nebr.

The university site has three fields, each planted to a different crop (corn, dry edible beans, and sugar beets) each year in a 3-year rotation. Each field is divided into three sections, each tilled by a different method—conventional (plow), rotary strip till, and no-till.

The off-station site consists of one field planted to one crop each year in a 3-year rotation of corn, dry edible beans, and sugar beets. The field is divided into one section each for conventional (plow) and disk methods.

The different tillage systems within the crop rotation are monitored for crop yields, soil moisture, soil temperature, plant stand, fuel and energy input, irrigation-induced soil erosion, irrigation infiltration rate, irrigation advance rate, surface residue cover, and soil surface aggregate size. Data collected during the establishment phase on performance factors, such as yield, soil moisture, surface cover, and irrigation efficiency, indicate that conservation tillage can be an important practice for maintaining the soil and water resources in the area and reducing production costs at the same time.

The research plots are highly visible and serve as valuable demonstrations of successful conservation tillage. Experience and data obtained from this project have been helpful to each of the cooperating agencies in working with individuals and groups of farmers who are interested in conservation tillage. By the end of the study, more useful data for assisting interested farmers should be available.

To coordinate educational programs and the activities of the cooperating agencies, a multi-disciplinary task force has been organized under the direction of the University of Nebraska Panhandle Research and Extension Center. The task force includes specialists and representatives from all of the cooperating agencies. Since the organization of the task force in August 1984, several educational conferences and demonstrations have been held in an effort to reduce the time between when farmers learn about conservation tillage practices and when they adopt them.

Another area of emphasis, beginning in the fall of 1985, will be a land users' incentive and demonstration program. Up to 12 farmers will be paid $30 per acre to try tillage techniques that are being developed in the study. Funds for this program will be provided for 3 years by RCA and administered by Ron Cacek, manager of the North Platte Natural Resources District. Phillip Rickey, SCS district conservationist at Scottsbluff, is coordinating the incentive program, and technical assistance is being provided by the task force and other SCS staff.

Arnold Bateman,
resource development specialist, University of Nebraska Cooperative Extension Service, Panhandle Research and Extension Center, Scottsbluff, Nebr.

Grazing Management Controls Weeds

Field trials in Jackson County, Oreg., are demonstrating that perennial wheatgrass can be managed to control yellow starthistle and other stubborn weeds.

Even with good range management, starthistle and winter annual grasses such as ripgut brome can prevent many rangeland plantings in southern Oregon from becoming established. These weeds can also infest established stands. Good moisture conditions and high nutrient levels in the soil produce good crops of weeds, but not necessarily good crops of desirable range forage.

To increase their yields, many ranchers in the area apply ammonium sulfate fertilizer to their grass stands in the fall when the soil is dry and firm enough for equipment travel. In wheatgrass stands, however, this fertilizer is either used by winter-active weedy

grasses or is leached out of the soil by winter rains. It does not appear to benefit the winter-dormant wheatgrass.

A better management system was suggested by Ben F. Roche, Jr., of Washington State University in Pullman. Research by Roche had indicated that grazing practices could be adjusted to control starthistle in stands of perennial grasses such as crested wheatgrass and 'Whitmar' beardless wheatgrass. Roche demonstrated that starthistle requires ample direct sunlight, especially late in spring as the plants are beginning to mature out of the rosette stage. By simulating delayed spring grazing of wheatgrass, he was able to control starthistle because ungrazed, taller wheatgrass blocks sunlight from the starthistle.

Another characteristic of starthistle plants is their ability to produce a taproot during the winter to the full depth of most soils. A rosette 4 to 6 inches in diameter can produce a taproot 4 to 6 feet deep, enabling the mature plant to draw moisture from the entire soil profile the following summer. Therefore, it seemed reasonable that a deep-rooted perennial such as wheatgrass could successfully compete against starthistle for the available soil moisture.

Encouraged by these findings, the Jackson Soil and Water Conservation District arranged for field plantings of wheatgrass on several ranches in the area. These plantings confirm that starthistle can be controlled by delaying spring grazing during the period when sunlight is critical for starthistle and by enabling the wheatgrass, by deferment, to use all the available soil moisture during the period when starthistle normally bolts to produce seed.

On the Jim Miller ranch near Ashland, a field of 4-year-old 'Largo' tall wheatgrass was completely infested with many species of grass and herbaceous weeds. The wheatgrass plants were very weak and only about 4 inches tall. To establish a good stand, weed control was achieved by applying the herbicide simazine to Miller's field in the fall of 1979 at a rate of 2 pounds per acre. The wheatgrass responded by producing more than 5,000 pounds of dry matter per acre the first year. It has averaged 3,600 pounds per acre every year since. This healthy stand of wheatgrass has provided good starthistle control and prevented reinfestation by winter annual grasses.

Similar results have been obtained with other field plantings. At the Chuck Stanley ranch near Eagle Point, delayed spring grazing of tall wheatgrass and fall grazing of the aftermath is producing 2,450 pounds of dry matter per acre annually and good weed control. At the Vern Gebhard ranch in Sams Valley, 'Oahe' intermediate wheatgrass controlled weeds and produced 2,200 pounds of dry matter per acre in the establishment year. It now produces approximately 3,000 pounds per acre each year and prevents weed infestation.

These plantings show that a proper management system should include delayed spring grazing to keep needed sunlight from the starthistle. Growth of the wheatgrass should be allowed to deplete as much available soil moisture as possible, and any nitrogen fertilizer used should be applied in the spring after the perennial forage plants have begun actively growing. When necessary, herbicides can help establish new stands and clean up old stands.

The ranchers growing the field plantings are helping to develop an effective system for controlling some of their most troublesome weeds. Their fields are proof that the keys to successful weed control are understanding the various growth stages of the undesirable plants, selecting and seeding desirable forage species for competition, and managing the rangeland to favor the growth needs of the desirable forage instead of the weeds.

Ed Weber,
district conservationist, SCS, Medford, Oreg.

Endowment Funds No-Till Drill

The National Endowment for Soil and Water Conservation has awarded a $4,400 grant to the Obion County, Tenn., Conservation District to purchase a no-till drill for seeding alfalfa.

The drill will be used by the conservation district in conjunction with the Tri-County Alfalfa Cooperative established in 1984 within the Reelfoot Lake Clean Water Project. The drill is manufactured by the Marliss Company of Arkansas and usually sells for $8,200. However, the company has agreed to sell the machine at its cost of $4,748. The portion of the purchase price not covered by the grant is being financed by local contributions.

The drill is designed for seeding irregular topography. The conservation district will coordinate its use during recommended seeding dates, and will provide an experienced employee to supervise its use and provide information about the production and management of alfalfa and orchardgrass.

According to Endowment Chairman Emmett Barker, "The Reelfoot Lake Clean Water Project is an important part of the effort to implement soil conservation practices that will ultimately reduce the flow of sediment now flowing into Reelfoot Lake, and I am glad that the Endowment could be a part of that effort."

Reelfoot Lake was created as the result of the New Madrid earthquakes of 1911 and 1912. It is a scenic natural area that attracts outdoors enthusiasts because of its hunting, fishing, and environmental characteristics. In recent years, it has been plagued with sediment flowing into the lake. The Tri-County Alfalfa Cooperative was established to encourage the use of soil conserving crops on sloping areas around the lake. It is only one part of a larger effort to reduce the flow of sediment into the lake.

The National Endowment for Soil and Water Conservation was established in 1982 to attract private funding of soil conservation efforts that would complement conservation programs of State and Federal governments.

Adapted from an article in
Communicating for Agriculture,
July-August 1985.

SCS Helps With Tornado Cleanup

The Soil Conservation Service helped clean up tornado damage this year in Pennsylvania. At the request of the Federal Emergency Management Agency (FEMA), SCS helped rural boroughs, townships, and counties contract for debris removal.

Following a rash of tornadoes that struck western Pennsylvania on May 31, about 35 municipalities needed help in removing debris and damaged property. Recovery operations required a massive effort by private citizens and Federal, State, and local agencies.

"SCS has a network of offices in each county and is experienced with working directly with rural residents and county officials," said James Oesterling, FEMA director of the tornado recovery. "We have used SCS in the past following floods and knew they could help in getting contracts implemented quickly."

Operations began with personnel from the U.S. Army Corps of Engineers and the Pennsylvania Department of Environmental Resources preparing reports on the properties destroyed or damaged beyond repair. These reports were reviewed and approved by FEMA and turned over to SCS and local officials. SCS and local officials together validated the damage reports, and the local officials determined which properties were to be put in the cleanup contracts. Local officials also obtained written permission from the landowners to do the work.

SCS personnel prepared the contracts and helped local officials set dates and times for job showings and bid openings. SCS engineers accompanied township and borough officers to the job showings and bid openings. The local officials hired the work inspectors, but SCS staff were available to advise and guide.

"We were technical advisors to the municipal officials," explained Mervin Ice, SCS State conservation engineer for Pennsylvania. "We guided the township supervisors and borough officers through the contracting and inspection of debris removal."

All of the steps happened within a short time frame. "Usually a job showing was held in the morning, bids were opened in the afternoon, and the work started the next morning," Ice said. This required the contractor to quickly post a construction bond and mobilize equipment. Most contracts were to be completed within 10 or 20 days, and local contractors were given preference.

Western Pennsylvania has different topography and vegetation than where tornadoes usually occur, and numerous trees were left blocking stream channels. SCS personnel determined which streams were blocked and needed to be cleared. The debris blocking bridges and culverts and causing channel restrictions posed flood threats.

Oesterling expressed satisfaction with the assistance provided by SCS to the rural communities. "SCS arrived at the damaged area on Wednesday, June 12, quickly organized, and started work on the first contract in Albion on Monday, June 17," said Oesterling. "Within a week, eight contracts were awarded and work was underway. By mid-July, SCS had assisted with more than 50 contracts and closed its operation at FEMA headquarters.

"Our goal," said Oesterling, "is to quickly clean up the health and safety hazards and speed the economic recovery of the community and its residents."

Frederick E. Bubb,
public affairs specialist, SCS, Harrisburg, Pa.

Report Available on Erosion and Sedimentation Models

Eleven conceptual models of soil erosion and sedimentation have been developed for Illinois as the result of a research project conducted by the Illinois State Water Survey, the Illinois State Geological Survey, and the Illinois Natural History Survey.

The models are detailed in a report titled "Conceptual Models of Erosion and Sedimentation in Illinois." Models were developed on two levels. The Level I model is very general but identifies the major subdivisions of the environment and the important natural and human factors which influence erosion and sedimentation processes. Four major systems are represented: upland, riverine, palustrine (wetlands), and lacustrine (lakes and reservoirs). Estuarine and marine systems, while absent in Illinois, are represented in the model. Most sediment and adsorbed materials are eventually deposited in these two systems.

The Level II models represent the complex interrelationships between various systems and subsystems. These models have been developed for agriculture, grassland, forest, mining, urban areas, construction, streams and rivers, permanent wetlands, seasonal wetlands, and lakes and reservoirs.

This project, funded by the Illinois Department of Energy and Natural Resources, is the first complete and systematic attempt to collect and compile all existing information on soil erosion and sedimentation processes in Illinois, provide an organized framework for this information, describe existing agency responsibilities with respect to these processes, and identify important gaps and future research needs. The next stage will be to develop the mathematical models to describe the processes described by the conceptual models.

The models will be useful to soil conservationists, watershed managers, those in agriculture, and others involved in soil management. The models will help determine the cause and effect relationships of different soil management practices.

Single copies of the report can be obtained from the Illinois State Water Survey, 2204 Griffith Drive, Champaign, Ill. 61820. Ask for Illinois Scientific Surveys Joint Report No. 1, Vol. I.

More Efficient Irrigation Benefits Wildlife in Nevada

At the 30,000-acre Carson Lake Pasture near Fallon, Nev., thousands of white-faced ibis, egrets, herons, snow geese, redhead ducks, avocets, and many other migratory waterfowl and ground-nesting birds can be seen. Habitat for such large populations of these birds is a rare resource in western Nevada with its arid climate and rugged landscape.

Carson Lake Pasture, once threatened by the overdraw of irrigation water, is now, thanks to the cooperative efforts of Federal, State, and local agencies and organizations, well on the road to becoming a stable resource.

The Carson Lake Pasture is the second largest natural marsh in the State. A little more than half is wetland used by migrating and nesting birds and other wildlife. The rest is irrigated pasture used for livestock grazing.

Most of the Carson Lake Pasture area is inland saline marsh. Emergent vegetation is hardstem bullrush, alkali bullrush, and cattail. Submergent vegetation includes sago pondweed, widgeongrass, and mushgrass. Some areas are classified as inland shallow fresh water marshes where the principal vegetation includes spikerushes and arrowhead.

Waterfowl that eat green browse, such as Canada and snow geese and many ducks, use the pasture. Other waterfowl use the main marsh and irrigation canals for feeding, resting, and nesting.

Redheads are the most numerous duck species nesting in the area. Past breeding populations have ranged from 213 to 965 pairs. The breeding population of white-faced ibis is one of the largest in the United States. The ibis arrive in March and leave by mid-September. The endangered bald eagle, a winter resident at Carson Lake, averages 450 bird-use days annually. Other reptorial species also depend upon the marsh habitat over winter.

The U.S. Department of the Interior's (USDI) Bureau of Reclamation owns the Carson Lake Pasture, and the Truckee-Carson Irrigation District (TCID) manages it in cooperation with an advisory board. The TCID leases part of the pasture for livestock grazing and has managed the pasture since 1927 when the land was included in the Newlands Project.

The Newlands Project was begun in 1903 to provide irrigation water to farms and ranches in the lower Carson Valley near Fallon by diverting Carson River water into irrigation channels. The same system irrigates the Carson Lake Pasture.

The pasture is saucer-shaped with a lower center, a marsh area, where the greatest concentrations of wildlife occur. Several drains and irrigation laterals enter the pasture from the north.

Over the years, as more people began drawing water for irrigation from water that had flowed into the marsh, it began drying up. Game and nongame bird populations began declining dramatically.

In the mid-1960's, the Nevada Department of Wildlife realized that something had to be done to save the marsh. Migrating waterfowl had relied on feeding and resting areas within the Carson Lake Pasture for centuries and the site is an important part of the Pacific Flyway from the Arctic to California.

In 1882, the Carson Lake marsh had covered close to 30,000 acres. By 1929, it covered a reported 19,000 acres, and in 1967, the Nevada Department of Wildlife reported a drop to 14,000 acres. In times of severe drought, the diversion of irrigation water has reduced Carson Lake to as low as 1,000 acres.

The Carson Lake Pasture advisory board made up of two representatives from TCID; the Nevada Department of Wildlife; the Green Head Duck Club, which operates a hunting lodge on pasture land leased from TCID; and the ranchers who run cattle on the community pasture worked together to decide how to save the marsh and still meet the needs of irrigators, grazers, and wildlife. Any action had to be sanctioned by the Bureau of Reclamation.

In 1978, TCID and the Green Head Duck Club paid to have about 5,000 acres of the marsh fenced off. That made it easier to manage the vegetation for both livestock and wildlife. When there's a need to control vegetation within the fenced area, livestock can be let in to graze it.

TCID also studied the irrigation system on the pasture and determined that improvements to make it more efficient could cut the amount of water needed to irrigate the pasture almost by half. That would make more water available to flow directly into the marsh, which would also reduce the amount of salts entering the marsh from irrigation return flows.

Provided that the project would send 50 percent more water to the marsh, 30 percent in direct flows and 20 percent in irrigation

The Carson Lake Pasture is the second largest natural marsh in Nevada. A little more than half is wetland used by migrating and nesting birds and other wildlife. The rest is irrigated pasture used for livestock grazing.

Photo by Dan Himsworth, public affairs specialist, SCS, Reno, Nev.

return flows, and provide other wildlife benefits, the Max C. Fleischmann Foundation of Nevada awarded a grant of $631,000 to TCID and the Nevada Department of Wildlife for marsh and pasture improvements in 1980. The Nevada Department of Wildlife agreed to underwrite the proposed marsh project if donated funds proved to be inadequate to complete the plan.

Planned projects include rebuilding two dikes, one 16,000 feet long and one 12,000 feet long; installing water control pipes and riser structures; installing five water measuring recorders to determine how much water reaches the marsh; and building three observation towers for public use.

Pasture projects include changing drain flows to wildlife areas on five drains, cleaning 7 miles of drains to improve water flows to the marsh, installing nine water measuring devices to determine total water reaching the pasture, constructing 1½ miles of new canals to deliver water to the Carson Lake Pasture, constructing three water control structures in new and improved canals, enlarging 4 miles of water delivery canals to replace lost drain water, constructing 40 irrigation check structures, installing 80 irrigation outlet structures, and improving 4½ miles of road access to water control structures.

The dikes in the marsh area will help managers keep smaller areas covered with water in short water years instead of letting the water spread out and evaporate. Construction of the dikes began this fall.

The measuring devices will help monitor the amount of water entering the marsh. The observation towers will help wildlife agencies and others record the different species of birds that come to the marsh and monitor changes in their numbers. The towers are also intended for use by visitors.

The pasture improvements are vital to sustaining the marsh because they will make it possible to direct more water to it on a regular basis.

The Soil Conservation Service is providing technical assistance in designing a 3-mile-long levee and a structure that diverts water from the drain near the hunting lodge three different ways. The main purpose of the work, said Gary Pfiefle, SCS district conservationist in Fallon, is to gain control of the water to manage the wetlands more efficiently. SCS also designed five small water control structures in the Madsen levee.

TCID manages the community pasture at Carson Lake and the Nevada Department of Wildlife manages the wildlife area.

TCID manager, Lyman McConnell, said that working through the Carson Lake Pasture advisory committee on problems like saving the marsh is much better than one group or agency working alone. Members of the committee can draw on many different resources, said McConnell, and that leads to better solutions.

Sam Millazzo, a regional supervisor for the Nevada Department of Wildlife, said, "One thing that makes the Carson Lake Pasture such a valuable wildlife area is that it is so flat. The water level fluctuates from 9 inches to nothing and wading birds can use the entire surface.

"The U.S. Fish and Wildlife Service has recently considered the white-faced ibis for listing as an endangered species," said Millazzo, "but ibis populations are responding well to the more stable habitat conditions at Carson Lake." The Carson Lake Pasture provides the bullrush vegetation that the ibis need to support their nests.

Preserving the wildlife area provides other benefits. The area will be used year round by game-bird hunters in season and by bird watchers. "This," said Norman Saake, waterfowl biologist with the Nevada Department of Wildlife, "should bring additional income to local businesses."

"We know the marsh at Carson Lake Pasture draws a wide variety of game and nongame birds," said Millazzo. "We hope as the area becomes more accessible and the watch towers are completed experienced birders will help us learn more about the inhabitants of this valuable wetland.

"Our main goal now is to move ahead on the improvements to the irrigation system and marsh area," said Millazzo. "Most important is to maintain local interest in preserving this oasis for wildlife."

Nancy M. Garlitz,
associate editor, *Soil and Water Conservation News*, SCS, Washington, DC

Volunteers Monitor Acid Rain

Armed with litmus paper, data forms, and plastic precipitation collectors, more than 100 volunteers in several southern Vermont counties are collecting data about acid rain in their own backyards.

The volunteers gather information after each storm in areas away from overhanging buildings and trees. They dip the litmus paper into the precipitation collector to determine the pH level (acidity). They record the pH as well as the amount of precipitation, time and duration of the storm, strength of the shower or snowfall, wind direction, presence of thunder or lightning, and air temperature.

Every 2 weeks the data are forwarded to the Dartmouth College Geology Department in Hanover, N.H., where they are plotted on a computer-generated isopleth map to establish a detailed scale of acid deposition. Preliminary findings indicate that higher elevations are receiving lower pH (more acidic) precipitation. The pH levels are slightly higher (less acidic) during winter apparently because snow does not pick up sulfates in the air as readily as rain does and the acid-forming substances are diluted by winter's more rapidly moving airmasses.

This project—now in its second year—is sponsored by the Conservation Society of Southern Vermont, a private nonprofit environmental advocacy group; the Lamson-Howell Foundation, a private foundation for community enhancement; and the George D. Aiken Resource Conservation and Development (RC&D) Area, Randolph, Vt. The RC&D area receives assistance from the Soil Conservation Service.

Dennis Borchardt, RC&D coordinator for the area, helped recruit the volunteers through newsletters, various civic clubs, conservation organizations, and the radio talk show "Breakfast at the Hanover Inn." Each volunteer paid $10 of the $13 cost of the monitoring kit.

Ann Dudas,
public affairs specialist, SCS, Winooski, Vt.

Fifty Years of Watershed Research

Soil erosion has been a serious problem for America and Americans throughout our history. Sometimes the erosion problem is highly visible and stimulates much public concern. Other times it is less visible, and public concern wanes.

The Soil Conservation Service was founded in 1935. That same year, in the rolling hills of Coshocton County, Ohio, SCS established the North Appalachian Experimental Watershed Research Station in cooperation with the Ohio State University—Ohio Agricultural Research and Development Center. Although this facility has undergone many changes over the years, it is still in use today collecting data and conducting research to help maintain progressive, practical soil an water conservation programs.

The Coshocton site was selected because it has soil conditions typical of many States in that part of the Nation. It is also in the Muskingum Watershed Conservancy District, an area active in large-scale flood control and water management.

The Federal Government and Coshocton County together purchased 1,047 acres for the facility in the early 1930's. In 1936, buildings were constructed at the facility and the first field research equipment was installed. Much of the early labor was provided by the Works Progress Administration (WPA) and the Civilian Conservation Corps (CCC).

The facility was dedicated on November 2, 1939, by Dr. Hugh H. Bennett, the first chief of SCS. "Only through constant experimentation and study," Bennett said, "can our conservation programs be kept dynamic and well."

By 1941 the research facility was in full operation. Soon scientists from around the world were coming to see the large-scale watershed hydrology research program. The Civilian Public Service Agency supplied labor and technical help during World War II.

Among the station's many features are three weighing lysimeters. Each lysimeter is a delicately balanced 65-ton mass of soil materials that uses scales to measure water infiltration into the soil to a 5-pound accuracy. The 5 pounds represents 0.01 inch of rain. The lysimeters also measure evaporation, transpiration, surface runoff, and the percolation of water down through the soil, water that would normally recharge the water table.

Each of the weighing lysimeters has been collecting data, automatically, every 10 minutes, 24 hours a day, 7 days a week, month after month for more than 47 years. They have made about 2.5 million measurements each. In addition to the three weighing lysimeters, there are eight other lysimeters that provide percolation and soil moisture data.

SCS operated a training center at the station from 1948 until 1963. In all, about 3,500 SCS employees from 22 States in the Northeast and Corn Belt attended 3- and 4-week training sessions at the station during this period. The training was intense, and the trainees ate and slept right at the station.

In 1954 a reorganization of the U.S. Department of Agriculture resulted in the transfer of the research facility from SCS to the Agricultural Research Service (ARS). True to its original purpose, however, the facility is still being used to determine the effect of land use and erosion-control practices on the conservation of water for crops and on flood control.

The information collected at Coshocton is necessary for the management of small and large areas. It involves tracing the variations in small plots and large watershed projects. Another concern is the rate and amount of runoff from precipitation of different intensities in watersheds of different sizes and shapes.

Over the past 50 years, research at the facility has focused on different—and often more specific—tasks consistent with current priorities and needs. For example, tests at the station showed that no-till reduces erosion to nearly zero on some soils. On other soils, no-till has a much less dramatic effect.

"This shows the need for a complete resource management system," said Bill Edwards, ARS soil scientist, "not just a single practice, even if it is no-till."

The facility recently completed a pasture management study and a 6-year study on animal waste and the management practices effective in reducing pollution from that source. Another study centered on the hydrology and water quality on surface mine areas before, during, and after mining.

The Coshocton Research Station has a long and enviable record, and its job isn't done. A current project is to determine the life cycle of herbicides and insecticides after application. Researchers want to know how much of the chemical stays on the land, how much evaporates into the air, and how much runs off with water or is attached to sediment.

For 50 years, the North Appalachian Experimental Watershed Research Station, in Coshocton County, Ohio, has been used for basic watershed research.

"The accumulated information on potential pollutants is important to crop producers, to consumers, and to everyone who drinks or uses water," said Edwards.

The facility is also being used for training again. In 1984, the SCS in Ohio began sending classes of new employees to Coshocton for training in conservation planning and application. "The station provides just the right atmosphere and hands-on experience to train young conservationists effectively," said Mervin Skiles, SCS State resource conservationist for Ohio.

Robert K. Kissler,
public affairs specialist, SCS, Columbus, Ohio

Conservation Society Issues Conservation Tillage Poster

The Soil Conservation Society of America has issued a poster titled "Are You a Conservation Tillage Farmer?" The poster graphically relates surface crop residue cover to soil loss by wind and water erosion. The text on the poster defines conservation tillage, reinforces the fact that crop residue on the soil surface reduces soil erosion, and makes the point that a farmer can control the amount of residue remaining on the soil surface after planting by virtue of the tillage equipment used and number of passes made across a field with that equipment. Full-color photos on the 23¼- by 36-inch poster provide a visual comparison of three different crop residue levels.

The poster is an educational tool for soil conservationists, farmers, and others concerned with agricultural production systems and soil conservation. It can be displayed in offices, elevators, farm supply stores, farm equipment dealerships, and many other locations. It can also be mounted and laminated for use at field days, fair exhibits, and other activities.

Copies of the poster, folded or flat, are available from the Soil Conservation Society of America, 7515 Northeast Ankeny Road, Ankeny, Iowa 50021.

SCS Relies on National Weather Service

How do you prevent floods if you don't know how much rainfall to expect? How do you design a dam if you don't know how much water it will have to hold?

Engineers of the Soil Conservation Service have wrestled with these questions for half a century. They often must design soil and water conservation structures in areas where no direct measurements are made of either rainfall or water runoff.

To overcome these limitations, SCS engineers have worked with the National Weather Service (NWS) to develop methods for making reliable estimates of the missing data. These estimates enable them to design practices and projects to meet specific objectives without overcompensating for the lack of recorded data. Only when engineers know what is required of a structure can they design it to adequately fill the need without reducing utility and safety.

The relationship between the SCS and the NWS goes back 30 years to when SCS began working with local groups to protect the soil in small watersheds and reduce upstream flooding. Harold Ogrosky, who was chief of the SCS Hydrology Branch, initiated a study with the NWS to estimate the amount and frequency of rainfall on a State-by-State basis. This information was later expanded into national maps known as rainfall-frequency atlases. These atlases have become the accepted standards within the engineering profession for predicting rainfall amounts for periods of up to 100 years. They are indispensable to SCS engineers, who prepare a minimum of 500,000 estimates of runoff each year—mostly from rainfall data in the atlases.

The NWS also provides assistance on specific projects, such as determining the probable maximum precipitation for estimating dam spillway capacity. Several years ago, for example, the NWS was asked to analyze flood-event rainfall patterns over an unusually shaped watershed in west Texas. NWS staff responded in less than 2 weeks with a study that enabled engineers to trim several hundred thousand dollars from the construction cost of a concrete spillway.

More than 30 publications have been prepared as a result of cooperative studies by the SCS and the NWS. In recent years, the NWS has studied such subjects as the amount of water available for runoff in the Northwest (combination of expected precipitation and the water content of snow); short-term rainfall intensities; depth-area relationships, particularly in arid areas (for estimating spillway capacity required for large dams); and antecedent precipitation associated with probable maximum precipitation. Each of these studies was undertaken to improve the ability of SCS to accurately predict rainfall and resultant runoff.

The assistance provided to the SCS by the NWS goes beyond the analysis of weather data. For example, NWS scientists have trained many SCS hydraulic engineers in hydrometeorology and have made numerous presentations describing NWS studies at SCS State, regional, and national workshops.

SCS engineers in the future will be looking to the NWS for help with projects such as constructing physical-process models. These projects will require many times the amount of data used 30 years ago. They would not be possible without the information already assembled during 3 decades of successful interagency cooperation.

Bob Rallison,
national hydraulic engineer, SCS, Washington, DC

Management Tips

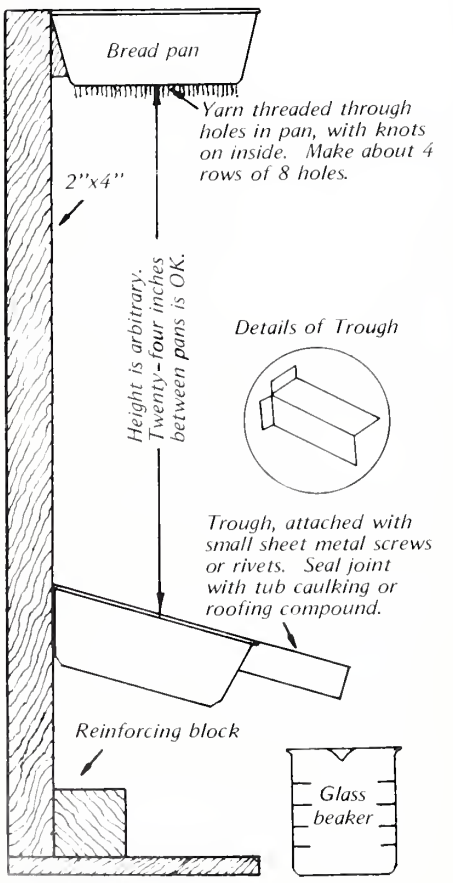
Readers are invited to submit "Management Tips" to the editor, *Soil and Water Conservation News*, Soil Conservation Service, P.O. Box 2890 Washington, DC 20013-2890.

A Practical Rain Simulator

You can build a practical rain simulator that can be used on television, for teacher workshops, or anywhere where a contrast between raindrop action on bare soil and covered soil is needed. The simulator illustrated here was designed by L. D. Meyer, agricultural engineer with the Agricultural Research Service.

The artificial rain is created by water dripping off yarn hanging from holes punched into the upper pan. Make holes with a nail, small enough that a piece of yarn fits snugly but not tightly. Each hole has a piece of yarn about an inch long threaded through, with a knot on the upper side to prevent it from falling out.

At least two simulators will be needed. The lower pans are filled with soil, and one of them is covered with clean straw or sod.



Can You Pass the Test?

The Washtenaw County, Mich., Soil Conservation District used the following conservation quiz in one of its newsletters to reach farmers with a conservation message:

SCD Conservation Quiz: Test Yourself

1. Are all the steep or eroding areas on your property protected by grass or trees?
2. Does the surface water flow at safe speeds without making a gully or cutting banks?
3. Are cropping systems sufficient to reduce erosion within limits?
4. Are the fewest trips made over the land for planting the crop?
5. Are enough residues left on the soil to stop or control erosion?
6. Are animal wastes returned to the soil in proper amounts and during the proper times?
7. Are fields soil tested to determine the proper kind and amounts of nutrients needed?
8. Are the ditches and tile mains checked for flow problems and repairs made?
9. Are wildlife needs planned for and carried out on property?
10. Are the woodlots managed for long-term yields and thinned as needed?

If you can answer yes to all of these questions, please call us so that we can honor you.

If you answered yes to seven or more, you are doing great. Call us so we can help you get all 10.

If you answered yes to five or less, call us soon so we can schedule enough time to review your whole farm.

If you answered yes to three or less, come in today because we have a long way to go.

No-Till Club Unites Farmers and Agri-Businesses

Membership in the McLean County, Ill., Soil and Water Conservation District's (SWCD) no-till club has quadrupled in just 3 years. The club was organized in 1982 to provide an avenue for conservation farmers to communicate better among themselves and with equipment and chemical representatives to meet the challenges of reduced tillage in Illinois agriculture.

Club members consist of no-tillers, ridge tillers, farm managers, equipment dealers, chemical representatives, and even conventional farmers.

"We do not limit our discussions to one area of agriculture," explained Gary Fak, Soil Conservation Service district conservationist in Bloomington. "Our speakers have addressed such topics as no-till, weed control, compaction problems, and proper sprayer calibration. We provide the information to the farmers and let them decide for themselves which tillage system, herbicides, or equipment best fits their program."

Club members meet three times during the winter months and hold a tour every summer on various club members' farms. Tour attendance for the past 3 years has ranged from 75 to more than 150. To reach more farmers, the tour is held in a different area of the county each year.

"This club has done more to increase conservation awareness in the county than any program offered in the past," said Mark Freed, past club president and no-till farmer near Lexington. "We have opened the door wider for better communication and increased cooperation between farmers, farm managers, farm machinery dealers, and chemical people than ever before."

With assistance from the SWCD, the no-till club has also contacted implement dealers to make rental equipment more readily available to farmers interested in trying a new tillage system. In 1983, area farmers used a new tillage tool called a paraplow on more than 730 acres. In addition, several dealers offered no-till planters for farmers to rent.

The no-till club plans to expand its tour into a statewide conservation show.

Mike Rahe,
former resource conservationist, McLean County Soil and Water Conservation District, Bloomington, Ill.

Entertainers for Soil Conservation

For 9 hours a day, every day of the 10-day Iowa State Fair, famous entertainers encouraged fairgoers to support soil conservation.

The pitch wasn't in person but was the next best thing to it. The personalities had been taped earlier by the Soil Conservation Service for television public service announcements. The Iowa SCS office asked the SCS Information Staff in Ft. Worth, Tex., to assemble all the spots into one brief tape, on a ½-inch cassette. They then placed the TV monitor into a display unit and, using an auto-rewind tape player, played the tape continuously.

The personalities attracted attention, and helped to stop people to view other parts of the exhibit.

Lynn Betts,
public affairs specialist, SCS, Des Moines, Iowa

Eagle Helps Watershed Fly

Kenneth Fudge, an Eagle Scout nominee from Framingham, Mass., developed a three-dimensional model of a nearby watershed site to help explain a proposed watershed project.

Framingham, a large community about 15 miles west of Boston, Mass., has experienced significant flooding along Baiting Brook three times in the last 30 years. The Baiting Brook Watershed Plan was developed by the Town of Framingham, the Middlesex Conservation District, the Massachusetts Department of Environmental Management, the Massachusetts Division of Water Resources, and the Soil Conservation Service to solve these flooding problems.

However, it is difficult to explain to large numbers of people the concepts of a watershed project and what a dam would look like after it was installed. So Kenneth Fudge, working with the Middlesex Conservation District and SCS, decided that a built-to-scale terrain model would help inform the local citizens about the watershed and the visual and physical impact of the proposed flood control dam.

Using discarded Styrofoam from a local computer manufacturer, Fudge shaped the land's topography in quarter-inch layers. Layers of gauze, glue, and plaster added lifelike contours. Wildflowers, gathered from the site and trimmed, yielded lifelike vegetation. Fudge then painted the model to look like the site.

After the model was completed, it was used at public meetings to show town citizens how the area would look after the structure was installed, helping to answer many questions about the watershed project.

Robert N. Morehouse,
district conservationist, SCS, Littleton, Mass.

Forages on Display

The Soil Conservation Service State office in New York has built a three-panel display that features live forage plants and a slide/tape show on the benefits of rotation grazing.

The 8-foot-tall display (shown at right), called Forages: A New Look at an Old Crop, was used at the Empire Field Days—3 days of demonstrations, farm equipment, and agricultural displays, which attracted about 300,000 people from across the Northeast. It focused on pasture management using no-till.

The display was built by SCS employees who donated their time and skills to complete the project. The middle panel supports a rear projection screen. Behind it is a projection booth with shelves for projectors and other equipment. The speaker is mounted in the same panel below the screen. Twelve 11- by 14-inch transparencies fill the other two panels.

Pat Paul,
public affairs specialist, SCS, Syracuse, N.Y.

New Publications

Soil Erosion and Conservation

Edited by S. A. El-Swaify, W. C. Moldenhauer, and Andrew Lo

This volume is based on papers presented at the International Conference on Soil Erosion and Conservation held in Honolulu, Hawaii in January 1983. It provided a continuing forum for the exchange of research findings and experiences in the search for solutions to soil and water conservation problems.

The presentations were divided into four sessions at the conference and are used in this volume to divide the chapters. They are: (1) delineating sediment sources and estimating the magnitude of soil erosion, (2) quantifying the impacts of soil erosion and sedimentation on land productivity and the environment, (3) establishing quantitative values for erosion-causing parameters, and (4) creating global and regional networks for implementing soil and water conservation programs.

As with the two preceding conferences, this 793-page volume will be useful to conservation professionals, technicians, and students throughout the world.

Soil Erosion and Conservation is available for $35 ($30 to Soil Conservation Society of America members) from SCSA, 7515 Northeast Ankeny Road, Ankeny, Iowa 50021.

Land-Saving Action

Edited by Russell L. Brenneman and Sarah M. Bates

This book is a virtual written symposium of 35 articles authored by 29 experts.

It discusses tax issues, the administration of land-saving organizations, the management of protected land, and the choices open to landowners. The book contains case studies which illustrate the innovative solutions that can be applied to land preservation efforts.

Land-Saving Action is available for $34.95, softbound ($64.95, hardback), plus $2.50 shipping and handling, from Island Press, Star Route 1, Box 38, Covelo, Calif. 95428.

Eroding Soils: The Off-Farm Impacts

by Edwin H. Clark II, Jennifer A. Haverkamp, and William Chapman

As many have come to realize, soil erosion reduces land productivity and often reduces crop yields. Soil erosion also takes its toll off the farm as well by: polluting waterways with sediment, fertilizers, and pesticides; accelerating the siltation of reservoirs and lakes; increasing the costs for dredging harbors; and increasing the siltation of rivers, leading to increased flooding.

The authors examine the problems caused by soil erosion off the farm and they address the serious problem of nonpoint-source pollution. They attempt to provide the most thorough tally of how much these problems cost each year. They discuss the effectiveness of current techniques for controlling runoff from agricultural lands, and ways to help target Federal soil conservation funds to alleviate the most severe problems.

The economic estimates and indepth treatment of off-farm impacts in this report may be of interest to professors and students of agriculture, water policy, resource economics, and pollution issues as well as environmentalists and citizens groups.

Eroding Soils is available for $15 from The Conservation Foundation, 1717 Massachusetts Avenue, NW., Washington, DC 20036.

The History of Soil and Water Conservation

Edited by Douglas Helms and Susan Flader

This publication consists of articles presented at a symposium held in May 1984 at the University of Missouri–Columbia on the history of soil and water conservation.

The papers are written by scientific researchers and engineers, historians, economists, geographers, and others from government agencies and private institutions. The authors share the same concern about the nature of soil and water conservation problems. The lead article examines changes in the political, economic, and technological environments since the 1930's that have affected the way Americans think about soil and water conservation problems and programs. Some of the articles discuss the history of soil erosion and erosion control in the United States since the 1800's, and the evolution of research approaches to soil erosion caused by wind and water.

This 244-page publication is available for $15 from Agricultural History Center, University of California, Davis, Calif. 95616.

Geomorphology

by Richard J. Chorley, Stanley A. Schumm, and David E. Sugden

In the Preface the authors state, "In writing *Geomorphology*, we have been concerned to meet a number of very important challenges in this rapidly evolving discipline." They further state that in this book "has emerged a balanced treatment of the philosophy of geomorphology, the influences of geology, geomorphic processes, the detailed geometry of landforms, the effects of climate, and practical applications of geomorphology."

Part I gives the background material needed to appreciate subsequent chapters. Part II is devoted to the geological basis of geomorphology.

In Part III the major process-response systems are identified and described, the resulting landforms and their evolution with respect to these processes are considered, and the dual theme of the historical and functional approaches to landform study continues to be explored.

Part IV examines the extent to which different climatic regimes are potentially capable of exerting direct and indirect influences on geomorphic processes.

This 606-page textbook is available for $30 from Methuen, Inc., 733 Third Ave., New York, N.Y. 10017.

Introduction to Plant Diseases: Identification and Management

by George B. Lucas, Charles L. Campbell, and Leon T. Lucas

Written for those without a background in biological sciences, this book provides practical information that helps in the successful management of diseases on food, fiber, and landscape plants. The authors discuss how to recognize a diseased plant, how to determine the cause of the disease, how to manage the disease, and where to seek additional help with disease problems.

Some of the 20 chapters have information on the history of plant pathology; management of plant diseases; and diseases caused by nematodes, soilborne fungi, airborne fungi, bacteria and mycoplasma, viruses, and parasitic plants.

Complete with photos, drawings, and tables, the text should be useful as a reference for teachers, farmers, home gardeners, landscape architects, agriculture extension agents, and pesticide salespeople.

This 307-page text is available for $29.50 from AVI Publishing Company, 250 Post Road East, P.O. Box 831, Westport, Conn. 06881.

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